

CLAIMS:

1. A pulse width-modulated noise shaper (210; 410), comprising:
an input adder (11) having a first input for receiving an input signal (S_{in}), and a second input;
an output terminal;
5 a main filter (130) having an input coupled to receive an output signal from said input adder (11);
a pulse width modulation circuit (220) having an input coupled to receive a signal derived from an output of said main filter (130), an output coupled to an output terminal of the pulse width-modulated noise shaper, and operable at a clock frequency (f_{ck});
10 a feedback path (216; 266) coupled between the output terminal and the second input for generating a feedback signal (S_{FB}) and for feeding this feedback signal (S_{FB}) back to the second input, the feedback path (216; 266) and the main filter (130) being operable at a clock frequency of at least the clock frequency (f_{ck}) of the pulse width modulation circuit (220).
- 15 2. A pulse width-modulated noise shaper (210; 410) according to claim 1, further comprising a power stage (260), coupled between the output of the pulse width modulation circuit (220) and the output terminal, the feedback path (266) comprising means for analog-to-digital conversion (240, 244, 245, 246).
- 20 3. A pulse width-modulated noise shaper (210; 410) according to claim 2, wherein the means for analog-to-digital conversion (240, 244, 245, 246) comprise:
a second adder (240) having a first input (241) coupled to the output terminal;
a loop filter (244) having an input coupled to receive an output signal from said second adder (240);
25 an analog-to-digital converter (245) having an input coupled to receive an output signal from said loop filter (244), and an output coupled to the second input of the input adder (11);
and a digital-to-analog converter (246) having an input coupled to receive an output signal from the analog-to-digital converter (245), and an output coupled to a second input (242) of the second adder (240).

4. A pulse width-modulated noise shaper (210; 410) according to claim 3, wherein said analog-to-digital converter (245) has a resolution of less than 5 bits.

5. A pulse width-modulated noise shaper (210; 410) according to claim 2, wherein said pulse width modulation circuit (220) and said power stage (260) comprise: a first branch comprising a first comparator (310), and a first class-D power stage (350) having an input coupled to receive an output signal from said first comparator (310), said first comparator (310) having a first input (311) coupled to receive the signal derived from the output signal of said main filter (130), and said pulse width modulation circuit (220) further comprising a reference signal generator (380) having an output coupled to a second input (312) of said first comparator (310).

6. A pulse width-modulated noise shaper (210; 410) according to claim 5, wherein said pulse width modulation circuit (220) and said power stage (260) further comprise: a second branch comprising a second comparator (320), and a second class-D power stage (360) having an input coupled to receive an output signal from said second comparator (320); said second comparator (320) having a first input (321) coupled to receive a signal which is inverted with respect to the signal derived from the output signal of said main filter (130), and said reference signal generator (380) having an output coupled to a second input (322) of said second comparator (320).

7. A pulse width-modulated noise shaper (210; 410) according to claim 6, wherein said feedback path (266) comprises means (290) for subtracting a feedback signal derived from said first class-D power stage (350) output (352) and a feedback signal derived from said second class-D power stage (360) output (362).

8. A digital-to-analog converter (300) comprising a pulse width-modulated noise shaper (210; 410) according to claim 1.

9. An electronic apparatus comprising a pulse width-modulated noise shaper (210; 410) according to claim 1 and signal processing circuitry for providing the input signal (S_{in}) in a digital format.